Dear Mayor,

The purpose of this memorandum is to update you and the council on the results of our investigation of the 3-display aerial light show using drones and to evaluate the feasibility and practicality of hosting this show.

The aim of our planning is to maximise the number of audience engaged, which in turn maximises the monetary revenues to be reaped from potential advertising, while at the same time minimise all resources employed. These include capital resources such as drones, land resources such as the required launch area for drones to take off, required air space for the drones to operate in, and labour resources such as operators employed to monitor the light show.

In order to conduct cost-benefit analysis on the outcome of the light show, we must ensure the feasibility of the event in the first place. By employing a few mathematical models, we successfully planned 3 displays of pattern to be shown during the light show, namely the Ferris Wheel, the Dragon and the Interstellar, using 320 drones in total.

To ensure the visual fidelity of the simulation of the display in the air and a prime view of the entire display using a minimum number of drones, we have planned drones’ positions in two different ways. For the first display, the Ferris Wheel, drones assembling the frame of pattern are placed equidistant to one another due to its nature being a relatively simple geometrical shape. Hence, the visual effect will only be compromised to a small extent using this method of equal distribution of drones. This is in contrast to the second display, the 2D pattern of a dragon which is relatively more complex and is difficult to be differentiated, and the third display of the planet-star system which is 3D in nature. Hence, we have carried out a fidelity test to determine the minimum number of drones required to achieve a fixed visual fidelity between the designed image and the displayed pattern of drones in the air. From this, we have concluded the total number of drones to be 320.

The schedule on the day of the light show will be as follows:

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| Time | Event |
| 5 hours before event | Set-up of drones in the launch area and testing |
| Start of the light show | |
| 0 min | Take-off from the launch area |
| 0 min - 2min | Ascending in pre-programmed paths |
| 2 min - 5 min | Display of pattern 1: Ferris Wheel |
| 5 min - 6 min | Transition from Ferris Wheel to Dragon |
| 6 min - 9 min | Display of pattern 2: Dragon |
| 9 min-  11 min | Descending to launch area for preparation of the third display |
| 11 min - 13 min | Ascending of drones in pre-programmed paths |
| 13 min - 16 min | Display of pattern 3: The interstellar |
| 16 min - 18 min | Descending of drones to launch area |
| End of the light show | |

Prior to the light show, all 320 drones will be placed in a designated launch area in equal distribution which allows them to cover the entire launch area in a tessellation pattern. They take off simultaneously, ascending in pre-programmed diagonal straight lines and assembling into the formation of the first two displays consecutively at a height of the 200m horizontally above the ground level. They then descend and ascend again to assemble into the final display of the 3D galaxy system.

The various colour combinations and flashing displayed by the LED lights on the drones, coupled with dazzling movements and animations of the drones, will certainly make the light show an annual visual feast.

Hosting such a large scale event will require a set of detained and well-thought-out safety precautions, especially when it comes to the deployment of unmanned aerial vehicles. Therefore, we have designed flights paths for each drone so as to minimise possibilities of clashing between drones. In order to ensure that all drones stay on their respective paths, all drones have an in-built navigation system to keep their positions relative to surrounding drones constant. There are also fixed stations on the ground that constantly monitor the movement of the entire fleet of drones relative to the ground so as to prevent drones from deviating from the programmed paths all-together and crush into surrounding buildings.

With the aim of maximising monetary revenues to be reaped from potential advertising and minimise the resources employed, our cost-benefit model has evaluated the practicality of hosting the light show and determined that the return rate of the event has exceeded your expectations.

Considering the high feasibility and practicality of hosting the light show, we strongly recommend you to host this aerial light show.

We look forward to discussing this further with you.

Very truly yours,

Organising committee